

**Notice of Allowability**

Application No.

09/683,369

Examiner

Sath V. Perungavoor

Applicant(s)

TU ET AL.

Art Unit

2624

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 4/19/2006.
2. ☒ The allowed claim(s) is/are 1-19.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some\* c) ☐ None of the:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.  
(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached  
1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.  
(b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |  |
|---|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)                                |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date <u>20060706</u> |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment  |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material          | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance                       |
|   | 9. <input type="checkbox"/> Other _____  |

### EXAMINER'S AMENDMENT

[1] An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

[2] Authorization for this examiner's amendment was given in a telephone interview with Mr. Patrick S. Yoder (Reg. No. 37,479) on July 5, 2006.

[3] The application has been amended as follows:

#### In claim 1

Please replace all subject matter in claim 1 with the following:

1. (currently amended) A method for identifying images of laser stripes projected onto the surface of an object in a non-contact gauge measurement system, comprising:

identifying a type of object to be imaged and based on the object type generating a template, the template representing an expected laser striping pattern and a local orientation or flow field at each point in images for each of a plurality of cameras, the template being based on prior knowledge of the surface of the object;

projecting one or more laser stripes onto a surface of the object;

obtaining an image of said projected laser stripes;

generating a matched filter for each pixel in said image from the template;

filtering said image with said generated matched filter along curves, wherein the curves are either parallel or perpendicular to the orientation of respective flow fields, such that the filter

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correlates the laser stripes to an expected laser striping pattern and orients filtering according to an expected local orientation or flow field; and

identifying the center of said projected laser stripes in said filtered image.

### **In claim 12**

Please replace all subject matter in claim 12 with the following:

12. (previously presented) A method for identifying images of laser stripes projected onto the surface of an object in a non-contact gauge measurement system, comprising:

identifying a type of object to be imaged and based on the object type generating a template, the template representing an expected laser striping pattern and a local orientation or flow field at each point in images for each of a plurality of cameras, the template being based on prior knowledge of the surface of the object;

projecting one or more laser stripes onto a surface of the object;

obtaining an image of said projected laser stripes;

generating a matched filter for each pixel in said image from said template by calculating:

$$(a) \quad v(i, j) = \sum_R (image(r) \times gaussian(r)) \text{ and}$$

$$(b) \quad t(i, j) = \sum_P (v(p) \times gaussian(p))$$

for each pixel (i,j) in said image, wherein image(r) is the image intensity value for a point on a curve R that emanates from pixel (i,j) and is always tangential to a flow field, and P is a curve that emanates from pixel (i,j) and is always perpendicular to the flow field;

filtering said image with said generated matched filter along curves, wherein the curves are parallel and perpendicular to the orientation of respective flow fields, such that the filter correlates

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the laser stripes to an expected laser striping pattern and orients filtering according to expected local orientation or flow field; and

identifying the center of said projected laser stripes in said filtered image.

**In claim 17**

Please replace all subject matter in claim 17 with the following:

17. (currently amended) A method for identifying images of laser stripes projected onto the surface of an object in a non-contact gauge measurement system, comprising:

identifying a type of object to be imaged and based on the object type generating a template, the template representing an expected laser striping pattern and a local orientation or flow field at each point in images for each of a plurality of cameras, the template being based on prior knowledge of the surface of the object;

projecting one or more laser stripes onto a surface of the object;

obtaining a two-dimensional image of said projected laser stripes;

generating a matched filter for each pixel in the image from the template;

filtering the image with the generated matched filter along curves, wherein the curves are either parallel or perpendicular to the orientation of respective flow fields, such that the filter correlates the laser stripes to an expected laser striping pattern and orients filtering according to expected local orientation or flow field;

identifying incoherent pixels or no pixels in said projected laser stripes; and

determining one or more corrupted laser stripes in said image based on the identification.

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**In claim 20**

Please cancel claim 20.

**REASONS FOR ALLOWANCE**

[4] The following is an examiner's statement of reasons for allowance: The instant invention attempts to ameliorate corrupted laser stripes through matched filtering (i.e. smoothing for noise removal) and epi-polar line based image reconstruction.

Prior art was found and applied in the non-final and final office actions. Applicant uniquely claimed a distinct feature in the instant invention, which are not found in the prior art, either singularly or in combination. The feature (emphasis added) is "filtering said image with said generated matched filter along curves, wherein the curves are either parallel or perpendicular to the orientation of respective flow fields, such that the filter correlates the laser stripes to an expected laser striping pattern and orients filtering according to an expected local orientation or flow field". This feature is not found or suggested in the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

[5] Claims 1-19 are allowed.

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### ***Contact Information***

[6] Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mr. Sath V. Perungavoor whose telephone number is (571) 272-7455. The examiner can normally be reached on Monday to Friday from 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Bhavesh M. Mehta whose telephone number is (571) 272-7453, can be reached on Monday to Friday from 9:00am to 5:00pm. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

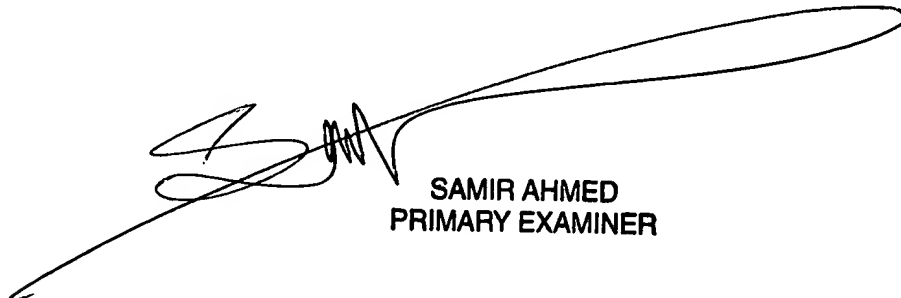
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dated: July 6, 2006

By: 

Sath V. Perungavoor  
Telephone: (571) 272-7455

For: Samir A. Ahmed

  
SAMIR AHMED  
PRIMARY EXAMINER